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**From:** Lindstrom, Andrew [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=04BF7CF26AA44CE29763FBC1C1B2338E-LINDSTROM, ANDREW]  
**Sent:** 9/15/2016 3:27:38 PM  
**To:** 'Post, Gloria' [Gloria.Post@dep.nj.gov]; 'Range, Linda' [Linda.Range@dep.nj.gov]  
**CC:** 'Lippincott, Lee' [Lee.Lippincott@dep.nj.gov]; 'Goodrow, Sandra' [Sandra.Goodrow@dep.nj.gov]; 'Zervas, Gwen' [Gwen.Zervas@dep.nj.gov]; Strynar, Mark [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5a9910d5b38e471497bd875fd329a20a-Strynar, Mark]  
**Subject:** RE: Your question on analysis of branched and linear PFOA isomers  
**Attachments:** Benskin et al. 2010 isomer profiling.pdf; Benskin rapid HPLC for PFAS 2012.pdf

Gloria,

I agree with your summary of this issue.

Check out the attached papers for some of the details.

Please let us know if you need more information.

Thank you,

Andy

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**From:** Post, Gloria [mailto:Gloria.Post@dep.nj.gov]  
**Sent:** Thursday, September 15, 2016 11:06 AM  
**To:** Range, Linda <Linda.Range@dep.nj.gov>  
**Cc:** Lippincott, Lee <Lee.Lippincott@dep.nj.gov>; Lindstrom, Andrew <Lindstrom.Andrew@epa.gov>; Goodrow, Sandra <Sandra.Goodrow@dep.nj.gov>; Zervas, Gwen <Gwen.Zervas@dep.nj.gov>  
**Subject:** RE: Your question on analysis of branched and linear PFOA isomers

Linda,

I spoke to both Lee Lippincott, the chemist in my group (DSREH) who has extensive experience with PFC analysis and Andy Lindstrom of USEPA Research Labs, who is an analytical chemist well known as a top expert on PFC analysis. (Andy and his colleagues are working with Erica Bergman of SRP and Sandra Goodrow of DSREH on developing a project to investigate PFCs at the Solvay site.)

I am going to summarize what Lee and Andy told me here. **Since I am paraphrasing what Lee and Andy told me, I hope that they chime in and correct anything that I may have misrepresented.**

They are both copied here, so please reach out to them for more information (and please copy me to keep me in the loop). Sandra Goodrow is also copied and should be kept in the loop.

To summarize, PFOA was made by two processes, electrochemical fluorination (ECF) ( primarily by 3M, I think) and telomerization (by DuPont, I think). Production with ECF ended in 2002, and production by telomerization began in 2002.

ECF makes a mixture of linear and branched isomers, but branched isomers are only about 20% of the total. Telomerization makes 100% linear PFOA. PFOA in the environment comes from both ECF and telomerization sources, so the total of branched isomers in the environment would be 20% or less.

The results reported from Method 537 likely capture some but not necessarily all of the branched isomers. The percent of the branched isomers detected would vary depending on the specific isomers present (there are 8 different branched

isomers of PFOA) and would also vary depending on the specific conditions under which the analysis is being conducted (e.g. old versus new column, etc).

However, the main point is that the reported results from Method 537 could under-report by about 20% at the most – if **ALL** of the PFOA was from ECF, AND **NONE** of the branched isomers were detected. It is unlikely that all of the PFOA would arise from ECF and that none of the branched isomers would be reported, so **the under-reporting is likely to be less than 20%**. In Andy Lindstrom's opinion, this potential difference is not a huge one in the context of other factors that may cause variability in analytical results from a methods such as 537.

Again, please reach out to Andy and Lee for more information, and please keep others copied here in the loop.

Thanks  
Gloria

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**From:** Range, Linda  
**Sent:** Thursday, September 15, 2016 9:50 AM  
**To:** Post, Gloria <[Gloria.Post@dep.nj.gov](mailto:Gloria.Post@dep.nj.gov)>  
**Subject:** RE: PFOA

That would be much appreciated.

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**From:** Post, Gloria  
**Sent:** Thursday, September 15, 2016 9:49 AM  
**To:** Range, Linda  
**Subject:** RE: PFOA

I am not sure this is true. I discussed this with Bernie Wilk before he passed away. I can talk to some knowledgeable people about this if you would like

THanks  
Gloria

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**From:** Range, Linda  
**Sent:** Thursday, September 15, 2016 9:48 AM  
**To:** Post, Gloria <[Gloria.Post@dep.nj.gov](mailto:Gloria.Post@dep.nj.gov)>  
**Cc:** Zervas, Gwen <[Gwen.Zervas@dep.nj.gov](mailto:Gwen.Zervas@dep.nj.gov)>  
**Subject:** PFOA

Hello Gloria,

I've just heard from an EPA case manager they've been advised by their Office of Water that there are two types of PFOA – linear and branched. And that this is important as Method 537 identifies only linear PFOA, thereby underestimating the total PFOA in a sample.

Is this accurate? And if so, how much of an impact would there actually be on analytical results from residential wells which may be impacted by PFOA?

Let me know if you have any questions and thank you for your time.

Linda S. Range  
Site Remediation Program  
Bureau of Case Management

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